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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/854,580
Filing Date: May 15, 2001
Appellant(s): LIN ET AL.

Timothy B. Kang
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 9, 2007 appealing from the
Office action mailed September 19, 2006

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,292,574	Schildkraut et al.	09-2001
6,181,806	Kado et al.	01-2001
5,410,618	Fowler	04-1995
6,680,745	Center, Jr. et al.	01-2004
6,009,209	Acker et al.	12-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 8, 10, 15, 21 and 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), in view of Kado et al. (US 6,181,806) and Fowler (US 5,410,618).

Regarding claim 1, and similarly claims 8, 15 and 21 (*all as amended*), Schildkraut discloses:

- automatically detecting one or more human faces in an image using face detection algorithms and automatically locating the one or more human faces in the image [Fig. 2, numeral S10; Fig. 6; Col. 4, line 13-Col. 5, line4]

Schildkraut does not expressly disclose

- automatically enhancing an appearance of the *entire* image by using a mapping technique to produce the image with target levels for a mean value or a variation value of the pixels in the one or more human faces, *wherein the entire image is automatically enhanced such that the pixels in the one or more human faces have the target levels for the mean value or the variation value of the pixels*

However, Kado discloses automatically measuring brightness (i.e., lightness levels) of human faces [Fig. 14, ref. 16 and col. 7, lines 33-36] and automatically enhances the image's brightness based on the measure brightness [col. 7, lines 44-46]. In addition, Fowler discloses linear mean invariant transforms (i.e., a mappings) that enhance lofargram images in such a way that the each and every strip of the image is enhanced to have *a target level of mean value* [Fig. 1, refs. 3-7; Col. 1, lines 30-40; Col. 3, lines 15-30; Col. 6, line 48-Col. 7, line 5. Note that here Fowler discloses enhancing *all* regions of an image such that each region has a target level for the mean value; in the case of an image containing faces, all facial regions and the non-facial region as a whole are all regions of the image (possibly as a result of some segmentation process). Therefore Fowler teaches enhancing the entire image.] [For demonstration purpose (but not relied upon for rejection) an example of a lofargram image can be found in the first slide of the presentation made by Vincent Premus in the 7th Annual ASAP '99 Workshop.]

Schildkraut, Kado and Fowler are combinable because they all have aspects that are from the same field of endeavor of image enhancement (note that red eye correction is a form of image enhancement).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Schildkraut with the teachings of Kado and Fowler to enhance detected human faces by using a mapping technique. The motivation would have been to

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improve visual quality, among other things, as Fowler indicated in [Col. 1, lines 11-20 and Col. 2, lines 28-35]. In addition, as the purpose of red eye correction is to provide an facial image with a better visual quality, it would have been obvious to go one step further by enhancing the overall visual quality of the faces (and not just the eyes) in the image since doing so would provide even better results to the clients (e.g., by a photo-processing lab to its customers).

Therefore, it would have been obvious to combine Kado and Fowler with Schildkraut to obtain the invention as specified in claim 1.

Regarding claim 2, and similarly claim 10, Kado further discloses

- wherein the module for enhancing the appearances of the image includes a module for automatically enhancing lightness levels of the images to enhance the appearance of the one or more human faces
[Fig. 14, ref. 16 and col. 7, lines 44-46]

Regarding claim 27, and similarly claims 28 and 29, Schildkraut further discloses

- automatically locating eyes in the human faces
[Fig. 2, numerals S16-S30; Figs. 9, 11]

Regarding claims 30 and 31, Fowler further discloses mapping using the recited equations. [Col. 6, line 48-Col. 7, line 5. Note that Eq. 13 is a more general mapping function that includes both scaling and offsetting. When only offsetting is performed, i.e., $A = 1$, Eq. 13 becomes $P + B$ (note that in line 1 of col. 7 "w" should have been "u"). On the other hand, when only scaling is performed, i.e., $B = 0$, Eq. 13 becomes

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$AP + (1-A)u$. Note further that B is the difference of the new and the original means and A is the square root of the ration of the new and the original variants, per Eqs. 11 and 12 in col. 6]

Regarding claims 32 and 33, note that as admitted in page 5, lines 13-18 of the specification, determining the target levels through a determination of human visual preferences is well known in the art and would obviously have been considered by one of ordinary skill in the art since facial images, especially photographs, are typically viewed by humans.

Claims 3, 4, 11, 12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), Kado et al. (US 6,181,806) and Fowler (US 5,410,618) as applied to claims 1, 2, 8, 10, 15, 21 and 27-33 above, further in view of Center, Jr. et al. (US 6,680,745).

Regarding claims 3 and 4, and similarly claims 11, 12 and 18, the combined invention of Schildkraut, Kado and Fowler discloses everything except the following, which Center teaches:

- wherein the module for enhancing the appearances of the image includes a module for automatically enhancing contrast levels (claim 3) or color levels (claim 4) of the images to enhance the appearance of the one or more human faces [Fig. 1; col. 2, lines 55-60. Note that while Center discloses adjusting the camera's settings, one of ordinary skill in the art would have recognized that such changes can be achieved by image processing means; see, for example, the analysis of claim 2 above in which Kado is relied upon for enhancing brightness]

The combined invention of Schildkraut, Kado and Fowler is combinable with Center because they have aspects that are from the same field of endeavor of face detection.

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Schildkraut, Kado and Fowler with the teaching of Center by enhancing an appearance of the image by changing the contrast and/or color (in addition to changing brightness as Kado disclosed). The motivation would have been to obtain better images, as Center indicated in column 2, lines 55-60.

Therefore, it would have been obvious to combine Center with Schildkraut, Kado and Fowler to obtain the inventions as specified in claims 3 and 4, respectively.

Claims 6, 14, 20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), Kado et al. (US 6,181,806) and Fowler (US 5,410,618) as applied to claims 1, 2, 8, 10, 15, 21 and 27-33 above, further in view of Acker et al. (US 6,009,209).

Regarding claim 6, and similarly claims 14, 20 and 25, the combined invention of Schildkraut, Kado and Fowler discloses all limitations except the following, which Acker et al. teaches:

- reducing or removing the red eye artifact from the human faces [Fig. 5, numeral 109; Fig. 9, numeral 504; Fig. 11; Fig. 13]

The combined invention of Schildkraut, Kado and Fowler is combinable with Acker because they have aspects that are from the same field of endeavor of red eye detection.

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Schildkraut, Kado and Fowler with the teaching of Acker et al. by detecting and removing red-eye effects from the image. The motivation would have been to remove the unpleasant appearance of red-eye defects in an image of a person's face caused by, e.g., a flash when the image was taken in order to produce a more natural-looking face.

Therefore, it would have been obvious to combine Acker et al. with Schildkraut, Kado and Fowler to obtain the invention as specified in claim 6.

(10) Response to Argument

(Note: In the following the cited page numbers of the appeal brief are the page number shown on upper-right corner of each page of the fax received on 08/09/2007 since the original page numbers are not obscured.)

Issue A: Rejection of claims 1, 2, 8, 10, 15, 21 and 27-33 based on Schildkraut et al., in view of Kato et al. and Fowler.

Appellant's arguments regarding Issue A are not persuasive. Specifically:

A.1 Appellant argues that because the mean and variance of the frequency in another vertical frequency strip have no effect on the pixels of the particular vertical frequency strip, the pixels of different strips may be modified to have different levels of enhancement and accordingly the entire lofargram image is not enhanced to make one of the vertical frequency strips have target levels for the mean value or the variation value of the pixels contained in any one of the vertical frequency strips (P. 11, 3rd paragraph-P. 12, 2nd paragraph)

Examiner's response:

Claim 1 sets forth that an image is produced "with target levels for a mean or a variation value of the pixels in the one or more human faces...such that the

pixels in the one or more human faces have the target levels for the mean or the variation value of the pixels.” In other words, each human face has a target level of mean or variation after the enhancement, which is exactly what Fowler teaches [Fig. 1, refs. 3-7; Col. 1, lines 30-40; Col. 3, lines 15-30 (the new, enhanced mean and variance are the target levels for each of the strips in the enhanced image); Col. 6, line 48-Col. 7, line 33; with each strip being a region of the image]. Note that claim 1 as recited does not require that the mean or variance of the pixels in one or more human faces (i.e., one or more regions of the image in question) to have any effect on the pixels of another region. In addition, Fowler clearly teaches enhancing the entire image since each and every strip is enhanced. Note further that even if all the faces are enhanced to have a *common* target level of mean or variation, Fowler’s teaching still applies since the collection of all faces in an image is nothing but a separate region of the image and the pixels within that region can be mapped (enhanced) in such a way that they collectively have a target mean or variation. Therefore the argument is not persuasive.

A.2 Appellant argues that the references cited by the examiner fail to at least disclose that the entire image is enhanced (P. 13, 2nd paragraph) because Schildkraut et al. and Kado et al. fail to disclose it (P. 13, 3rd paragraph; P. 14, 2nd paragraph) and Fowler does not cure this deficiency (P. 15, 2nd paragraph)

Examiner's response:

First, enhancing an entire image does not necessarily mean that each and every pixel value has to be altered (not a claim requirement, nor expressly defined in such a way in the specification). The pixels in a portion of an image can be altered in such a way that the entire image is considered enhanced since it results in a more, say, pleasing overall visual effect. An example is the red-eye correction (in which the unpleasant red eyes due to the flash of the camera is corrected). Nonetheless, Fowler clearly teaches enhancing the entire image since each and every one of the strips in the lofargram (an image) is enhanced [Fig. 1, refs. 3-7; Col. 3, lines 15-30]. Whether applying Fowler's teaching will result in various sections of the image containing the human faces being separately enhanced (as appellant alleges in P. 15, 2nd paragraph, last three lines) is irrelevant since claim 1 does not require all faces to be enhanced as a whole and even if it does, the collection of face sections can be considered as a single region (namely, a "face region") and the teaching of Fowler still applies.

A.3 Appellant argues that none of the cited references discloses that the target levels for a mean or a variation are desirable lightness and contrast levels that are determined through a determination of human visual preferences (P. 15, 2nd paragraph through P. 18, 2nd paragraph)

Examiner's response:

Examiner's response:

However, Kato does disclose that the pixel values that are to be enhanced to achieve target levels for a mean are lightness values [Fig. 14, ref. 16 and Col. 7, lines 44-46]. Note also that when lightness is adjusted, contrast may change accordingly. In any event, per the analysis in the rejection of claims 30 and 31 (see section 9 above), Fowler also discloses adjusting the pixel values to achieve a desired variance value, which results in a different contrast. Additionally, using target levels for a mean or a variation that are desirable lightness and contrast levels determined through a determination of human visual preferences is known in the art, as appellant admits in page 5, lines 13-16, and one of ordinary skill in the art would have a good reason to do so since it typically would have been a human being who would be viewing the digital images as shown in, e.g., figure 1 of Schildkraut et al. (Note: Appellant made a similar argument in the amendment filed 03/23/2006 and this response is essentially from the office action mailed 05/03/2006, in response to this argument.)

A.4 Appellant argues that the proposed combination is improper because (1) Fowler is directed to sonar images and both Schildkraut et al. and Kado et al. are directed to facial images and as such it appears likely that the proposed combination of documents was based on improper hindsight reasoning and (2) that the proposed combination would still fail to disclose each and every element claimed in claims 1, 8, 15 and 21 (P.18, sect. d); as well as (3) that one would not

have been motivated to combine the references (P. 19, 1st paragraph) and (4) that there is no clear indication as to what the proposed combination would yield (P. 19, 2nd paragraph)

Examiner's response:

Regarding (1) and (3), in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, all three references have aspects that deal with the enhancement of digital images and the admitted prior art [P. 5, lines 13-16 of the instance application] discloses that there are desirable levels for a mean value and/or a variation value that people prefer, and Fowler teaches how this can be accomplished [Fig. 1, refs. 3-7; Col. 1, lines 30-40; Col. 3, lines 15-30 (the new, enhanced mean and variance are the target levels for each of the strips in the enhanced image); Col. 6, line 48-Col. 7, line 33; with each strip being a region of the image] and the result is improved visual quality [Col. 2, lines 28-35]. Therefore the argument is not persuasive.

Regarding (2), it is not persuasive because all limitations have been disclosed or taught by the combined references; see the analysis and rejection of claims 1, 2, 8, 10, 15, 21 and 27-33 (reproduced in section 9 above) as well as A.1-A.3 of this section. Therefore the argument is not persuasive.

Regarding (4), note that, for example, the combined invention of Schildkraut et al. Kado et al. and Fowler will predictably result in the invention as specified in claim 1 since Schildkraut et al. discloses a method that automatically detects and locates faces in an image and performs a kind of facial enhancement (namely red-eye correction), Kado et al. teaches automatic enhancement of the appearance (brightness in this case) of human faces, and Fowler teaches how the enhancement is carried out (namely by using a mapping technique to produce an image such that the different sections of the image have target levels of mean or variation). Again, see the analysis and rejection of claims 1, 2, 8, 10, 15, 21 and 27-33 (reproduced in section 9 above) as well as A.1-A.3 of this section. Therefore the argument is not persuasive.

Issue B: Rejection of claims 3, 4, 11, 12 and 18 based on Schildkraut et al., Kato et al. and Fowler, and further in view of Center, Jr. et al.

Appellant's argument regarding Issue B is not persuasive. Specifically:

B.1 Appellant argues that the Center, Jr. et al. does not make up for the deficiencies in Schildkraut et al., Kato et al. and Fowler (P. 20, sect. 2)

Examiner's response:

Center, Jr. et al. is not relied upon to make up for the deficiencies in Schildkraut et al., Kato et al. and Fowler.

Issue C: Rejection of claims 6, 14, 20 and 25 based on Schildkraut et al., Kato et al. and Fowler, and further in view of Acker et al.

Appellant's argument regarding Issue C is not persuasive. Specifically:

C.1 Appellant argues that the Acker et al. does not make up for the deficiencies in Schildkraut et al., Kato et al. and Fowler (PP. 20-21, sect. 3)

Examiner's response:

Acker et al. is not relied upon to make up for the deficiencies in Schildkraut et al., Kato et al. and Fowler.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Yubin Hung



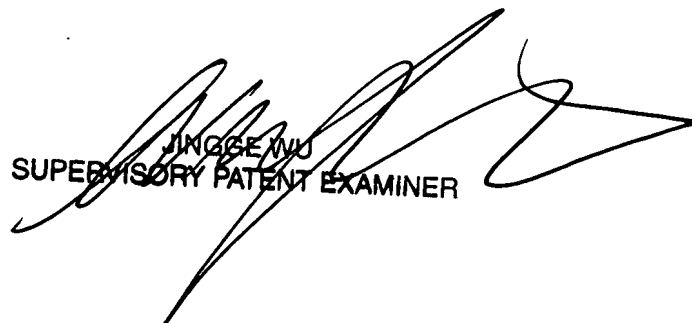
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